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10/617,025

07/11/2003

Makoto Komatsu

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EXAMINER

ASINOVSKY, OLGA

ART UNIT

PAPER NUMBER

1711

MAIL DATE

DELIVERY MODE

06/20/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|-------------------------------|--------------------------------|--|
| Office Action Summary | Application No. 10/617,025 | Applicant(s) KOMATSU ET AL. | |
| | Examiner Olga Asinovsky | Art Unit 1711 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 March 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-4,6,12-14,18-21 and 35-47 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2-4,6,12-14,18-21 and 35-47 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 04/06/2007 has been entered.

Applicants present new two independent claims 35 and 36 having two different chemical species for grafted monomers onto the backbone polymer.

New search is made for each separate group.

Claim Rejections - 35 USC § 112

2. Claims 6, 18, 19, 20, 40, 44, 45, 46 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In each claim 6, 18 19, 20 the step of converting the quaternary ammonia-type anion exchange group into a reactive functional group is not clear, and a process has no process condition step how to convert said quaternary ammonia-type anion exchange group into a reactive functional group. Each recited claim is depending on independent claim 35. It is not clear how to introduce the X⁻ reactive functional group for ion exchange product.

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In each claim 40, 44, 45 and 46 the step of converting the quaternary pyridinium-type anion exchange group into a reactive functional group is not clear, and a process has no process condition step how to convert said quaternary pyridinium-type anion exchange group into a reactive functional group. Each recited claim is depending on independent claim 36. It is not clear how to introduce the X⁻ reactive functional group for ion exchange product.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 2-4, 6, 12-14, 18-21 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komatsu et al U.S. Patent 6,844,371 or Sugo et al U.S. Patent 6,228,135.

Independent claim 35 introduces a grafted polymer side chain onto a backbone of an organic polymer base, wherein said graft polymer has a chemical formula (I) having X⁻ reactive functional group. The examiner presumes that said X⁻ reactive functional group is obtained by a post polymerization step by additional ion exchange effect depending on the environment contact for using a solid reagent.

The term "serves" in each claim 4, 13 and 14 is intended use of said reactive functional group as a reagent depending on the environment fields.

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Komatsu discloses organic polymer bases in the form of a polymer fiber or a woven or nonwoven fabric (backbone polymer) that is radiated to induce graft polymerization. A polymer side chain derived from a p-haloalkylstyrene is grafted on the backbone polymer. Then, the halogen group on the polymer side chain is replaced with a compound having a functional group such as an ion exchange group. The ion exchange groups include quaternary ammonium and tertiary amino groups, column 3, lines 50-67 and column 4, lines 32-67. Komatsu discloses the claimed steps for producing a solid reagent having a hydrophilic group such as quaternary ammonium that is readable in the claimed formula (I) in claim 35. The quaternary ammonium group has excellent properties as material for desorbing water, column 5, lines 38-41. Komatsu may not expressly teach claimed "converting" the quaternary ammonia-type anion exchange group on the graft polymer side chain "into a reactive functional group X^- " selected from the specified groups in claim 35. However, in light on the statement in Komatsu invention that the quaternary ammonium group on the grafted polymer side chain is chemically/physically reactive group, it would have been obvious to one of ordinary skill in the art to consider that the quaternary ammonium group can be converted into a reactive ion exchange group specified in claim 35, since it is depending on the selected/desired environment areas for using said solid reagent.

Sugo discloses an ion-exchange fiber comprising a fibrous substrate being radiation initiated and grafted with chloromethylstyrene or vinylpyridine, column 5, line 28.

Chloromethylstyrene can be converted into amine group by the reaction with amines.

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Also, chloromethylstyrene can be converted into a quaternary ammonium groups.

Vinylpyridine can be converted into quaternary ammonium groups by the reaction with alkyl halogenates, column 5, lines 32-35. The resulting anion containing fibers can be used as air purifying filter, in "biological" clean room, as well as in hospital, column 5, lines 58-63. The hydrophilic quaternary ammonium group in grafted chloromethylstyrene side polymer is chemically reactive and is capable for performing a secondary reaction to effect conversion to the ion-exchange groups for introduction into the substrate, column 5, lines 5-10. Therefore, Sugo'135 discloses introducing a quaternary ammonium group capable being converted in to reactive ion-exchange group for making ion-exchange fiber filter.

Sugo'135 does not disclose ion-exchange reactive functional group X^- specified in the present claim 35. It would have been obvious to one of ordinary skill in the art to consider that the claimed reactive functional group X^- is obtained in Sugo invention because Sugo discloses the analogous quaternary ammonium contained chloromethylstyrene grafted on the fiber filter=solid reagent and using said air filter in environmental fields such as in "biological" clean rooms or industrial clean rooms.

5. Claims 36-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugo et al U.S. Patent 6,228,135 or Andreola et al U.S. Patent 5,643,968.

Independent claim 36 discloses a graft polymer side chain based on 4-vinylpyridine and introducing a quaternary pyridinium-type anion exchange group capable of being converted into a reactive functional group X^- specified in the claims. The examiner

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presumes that said X^- reactive functional group is obtained by a post polymerization step by additional ion exchange effect depending on the environment contact for using a solid reagent.

The term "serves" in each claim 4, 13 and 14 is intended use of said reactive functional group as a reagent depending on the environment fields.

Sugo has been discussed above in the paragraph 4. All discussions are adequately set here.

Andreola discloses ion exchange membranes comprising a backbone polymer and grafted polymerizable 4-vinylpyridine capable for producing quaternary pyridinium anion exchange group. The amine transformation for at least represented by formula (H) at column 7 is readable in the present claim 36. Although, Andreola does not disclose the specified reactive functional group X^- , it would have been obvious to one of ordinary skill in the art to consider that the specified reactive functional group can be obtained since Andreola discloses the analogous anion exchange group on the graft polymer side chain that is converted in to a reactive bromide ion functional group.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Olga Asinovsky whose telephone number is 571-272-1066. The examiner can normally be reached on 9:00 to 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Seidleck can be reached on 571-272-1078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

O.A.

June 17, 2007



James J. Seidleck
Supervisory Patent Examiner
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